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Claims

We claim:

- 1 1. A method for extracting speech recognition features from a speech signal coded
2 as a bitstream, comprising:
 - 3 decoding the bitstream to recover linear predictive coding filter parameters;
 - 4 decoding the bitstream to recover a residual signal; and
 - 5 discriminatively combining the linear predictive coding filter parameters and
6 the residual signal into speech recognition features.
- 1 2. The method of claim 1 further comprising:
 - 2 up-sampling the linear predictive coding parameters; and
 - 3 interpolating the up-sampled linear predictive coding parameters.
- 1 3. The method of claim 2 wherein a set of samples is obtained for every frame of
2 the bitstream.
- 1 4. The method of claim 2 further comprising:
 - 2 deriving cepstral vectors from the up-sampled LPC filter parameters.
- 1 5. The method of claim 1 further comprising:
 - 2 setting short-term prediction coefficients to zero; and
 - 3 decoding the bitstream to obtain the residual signal.

- 1 6. The method of claim 1 further comprising:
2 analyzing an entire spectrum of the residual signal.
- 1 7. The method of claim further comprising:
2 derive a high-dimensional log spectra from the residual signal for each set of
3 up-sampled LPC filter parameters.
- 1 8. The method of claim 1 further comprising:
2 deriving a cepstral vector corresponding to each set of linear predictive of
3 each frame;
4 deriving a high-dimensional log spectra from the residual signal for each
5 frame;
6 concatenating the cepstral vector with each corresponding high-dimensional
7 log spectra for each frame to generated an extended vector.
- 1 9. The method of claim 8 further comprising:
2 reducing a dimensionality of the extended vector using linear discriminant
3 analysis.
- 1 10. The method of claim 8 further comprising:
2 reducing a dimensionality of the extended vector using discriminant neural
3 network.
- 1 11. The method of claim 1 wherein the speech recognition features are extracted
2 from a bitstream in a server executing a speech recognizer.